

1. A system for expressing a polynucleotide of interest in a plant cell or whole plant, comprising:
  - a carrier vector that includes a coat protein encoding component from a first plant virus; and
  - a producer vector that includes a polynucleotide of interest, and further includes at least one component from a second plant virus, but lacks a functional coat protein gene.
2. The system of claim 1, wherein the first and second plant viruses are the same virus.
3. The system of claim 1, wherein the first and second plant viruses are different viruses.
4. The system of claim 1, wherein the carrier vector comprises a wild type viral genome.
5. The system of claim 1, wherein the carrier vector comprises at least one polynucleotide encoding a replication protein and comprises sufficient non-coding portions to allow self-replication.
6. The system of claim 1, wherein the carrier vector lacks one or more components required for self-replication.
7. The system of claim 6, wherein the one or more components required for self-replication is a functional replication protein coding portion found in the first plant virus.
8. The system of claim 6, wherein the one or more components required for self-replication of the carrier vector is supplied by the producer vector.
9. The system of claim 8, wherein the carrier vector comprises a genomic promoter found in the second plant virus.
10. The system of claim 6, wherein the one or more components required for self-replication is a noncoding portion found in the first plant virus.

11. The system of claim 1, wherein the producer vector comprises at least one polynucleotide encoding a replication protein and comprises sufficient non-coding portions to allow self-replication.
12. The system of claim 1, wherein the producer vector lacks one or more components required for self-replication.
13. The system of claim 6, wherein the one or more components required for self-replication is a functional replication protein coding portion found in the second plant virus.
14. The system of claim 13, wherein the one or more components required for self-replication of the producer vector is supplied by the carrier vector.
15. The system of claim 6, wherein the producer vector comprises a genomic promoter from the first plant virus.
16. The system of claim 6, wherein the one or more components required for self-replication is a noncoding portion found in the second plant virus.
17. The system of claim 1, wherein the at least one component from a second plant virus comprises a polynucleotide that encodes a polypeptide selected from the group consisting of: a replication protein, a movement protein, and a coat protein.
18. The system of claim 1, wherein the at least one component from a second plant virus comprises a non-coding portion of the genome of the second plant virus.
19. The system of claim 1, wherein the at least one component from a second plant virus comprises a 5' or 3' untranslated region from a viral RNA.
20. The system of claim 1, wherein either the carrier vector or the producer vector, but not both, lacks a functional movement protein encoding portion.
21. The system of claim 1, wherein the carrier vector lacks a functional movement protein coding portion.

22. The system of claim 21, wherein the producer vector comprises a functional movement coding protein portion.
23. The system of claim 1, wherein the producer vector lacks a functional movement protein coding portion.
24. The system of claim 23, wherein the carrier vector comprises a functional movement protein coding portion that complements the producer vector's lack of a functional movement coding portion.
25. The system of claim 1, wherein the producer vector comprises a component from the first plant virus.
26. The system of claim 25, wherein the component is an untranslated region from a viral RNA.
27. The system of claim 1, wherein the carrier vector, the producer vector, or both comprise a portion of the first virus other than a coat protein coding portion, which portion facilitates systemic spread.
28. The system of claim 27, wherein the portion that facilitates systemic spread comprises a recognition site for complex formation with coat protein.
29. The system of claim 1, wherein the carrier vector, the producer vector, or both, are in RNA form.
30. The system of claim 1, wherein the carrier vector, the producer vector, or both, are in DNA form.
31. The system of claim 1, wherein each of the first and second plant viruses is independently selected from the group consisting of: a bromovirus and a tobamovirus.
32. The system of claim 31, wherein the bromovirus is an alfamovirus.
33. The system of claim 31, wherein the bromovirus is alfalfa mosaic virus.

34. The system of claim 33, wherein the tobamovirus is a tobacco mosaic virus.
35. The system of claim 31, wherein the bromovirus is an ilarvirus.
36. The system of claim 35, wherein the tobamovirus is a tobacco mosaic virus.
37. The system of claim 31, wherein the tobamovirus is a tobacco mosaic virus.
38. The system of claim 1, wherein the polynucleotide is selected from the group consisting of polynucleotides encoding therapeutic proteins, polynucleotides encoding one or more antibody chains, polynucleotides encoding nutritionally relevant proteins, and polynucleotides that provide a template for transcription of active RNA species.
39. A system for expressing a polynucleotide of interest in a plant cell or whole plant, comprising:
  - a carrier vector that includes a movement protein encoding component from a first plant virus; and
  - a producer vector that includes a polynucleotide of interest, and further includes at least one component from a second plant virus, but lacks a functional movement protein gene.
40. The system of claim 39, wherein the first and second plant viruses are the same virus.
41. The system of claim 39, wherein the first and second plant viruses are different viruses.
42. The system of claim 39, wherein the carrier vector comprises a wild type viral genome.
43. The system of claim 39, wherein the producer vector lacks a functional coat protein gene.
44. The system of claim 39, wherein the producer vector comprises a functional coat protein gene from the second virus.
45. The system of claim 39, wherein the producer vector does not comprise a functional coat protein gene from the second virus.

46. A system for expressing a polynucleotide of interest in a plant cell or whole plant, comprising:
  - a carrier vector that includes a replication protein encoding component from a first plant virus; and
  - a producer vector that includes a polynucleotide of interest, and further includes at least one component from a second plant virus, but lacks one or more functional replication protein genes normally found in the second plant virus.
47. The system of claim 46, wherein the first and second plant viruses are the same virus.
48. The system of claim 46, wherein the first and second plant viruses are different viruses.
49. The system of claim 46, wherein the carrier vector comprises a wild type viral genome.
50. A vector comprising:
  - (a) one or more components from a first plant virus
  - (b) a partial or complete 3' untranslated region from an RNA of a second plant virus.
51. The vector of claim 50, wherein the 3' untranslated region facilitates systemic spread of the virus.
52. The vector of claim 51, wherein the 3' untranslated region comprises a recognition site for complex formation with coat protein.
53. The vector of claim 50, wherein the second plant virus is a bromovirus.
54. The vector of claim 50, wherein the second plant virus is an ilarvirus.
55. The vector of claim 50, wherein the second plant virus is an alfamovirus.
56. The vector of claim 50, wherein the second plant virus is alfalfa mosaic virus.
57. The vector of claim 50, wherein the second plant virus is a bromovirus and the 3' untranslated region comprises at least a portion of an RNA3 untranslated region.

58. The vector of claim 50, wherein the second plant virus is an ilarvirus and the 3' untranslated region comprises at least a portion of an RNA3 untranslated region.
59. The vector of claim 50, wherein the second plant virus is an alfamovirus and the 3' untranslated region comprises at least a portion of an RNA3 untranslated region.
60. The vector of claim 50, wherein the second plant virus is alfalfa mosaic virus and the 3' untranslated region comprises at least a portion of an RNA3 untranslated region.
61. The vector of claim 60, wherein the 3' untranslated region comprises at least nucleotides 1859-1969 of the alfalfa mosaic virus genome.
62. The vector of claim 61, wherein the 3' untranslated region further comprises at least a portion of nucleotides 1970-2037 of the alfalfa mosaic virus genome.
63. The vector of claim 50, wherein the first plant virus is a tobamovirus
64. The vector of claim 50, wherein the first plant virus is tobacco mosaic virus.
65. The vector of claim 50, wherein the first plant virus is tobacco mosaic virus and the second plant virus is alfalfa mosaic virus.
66. The vector of claim 50, wherein the vector further comprises at least a portion of a 3' untranslated region of an RNA of the first plant virus, or a complement thereof.
67. The vector of claim 66, wherein the first plant virus is tobacco mosaic virus and the 3' untranslated region comprises nucleotides 6192 to 6395 of TMV.
68. The vector of claim 50, wherein the vector is in DNA form.
69. The vector of claim 50, wherein the vector is in RNA form.
70. A method of expressing a polynucleotide of interest in a plant, the method comprising steps of:
  - (a) introducing into a plant

(i) a carrier vector that includes a functional coat protein encoding component from a first plant virus; and

(ii) a producer vector that includes a polynucleotide of interest and at least one component from a second plant virus but lacks a functional coat protein gene;

(b) maintaining the plant under conditions and for a time sufficient to allow the carrier vector to complement the producer vector, so that the producer vector moves systemically in the plant; and

(c) maintaining the plant under conditions and for a time sufficient that the polynucleotide is expressed in at least some plant cells.

71. The method of claim 70, wherein the first and second plant viruses are the same virus.
72. The method of claim 70, wherein the first and second plant viruses are different viruses.
73. The method of claim 70, wherein the carrier vector comprises a wild type viral genome or complement thereof.
74. A method of expressing a polynucleotide of interest in a plant, the method comprising steps of:
  - (a) introducing into a plant
    - (i) a carrier vector that includes a functional movement protein encoding component from a first plant virus; and
    - (ii) a producer vector that includes a polynucleotide of interest and at least one component from a second plant virus but lacks a functional movement protein gene; and
  - (b) maintaining the plant under conditions and for a time sufficient to allow the carrier vector to complement the producer vector, so that the producer vector moves cell-to-cell in the plant; and
  - (c) maintaining the plant under conditions and for a time sufficient that the polynucleotide is expressed in at least some plant cells.

75. The method of claim 74, wherein the first and second plant viruses are the same virus.
76. The method of claim 74, wherein the first and second plant viruses are different viruses.

77. The method of claim 74, wherein the carrier vector comprises a wild type viral genome or complement thereof.
78. A method of expressing a polynucleotide of interest in a plant, the method comprising steps of:
  - (a) introducing into a plant
    - (i) a carrier vector that includes a functional coat protein encoding component from a first plant virus; and
    - (ii) a producer vector that includes a polynucleotide of interest and at least one component from a second plant virus but lacks one or more functional replication protein genes normally found in the second plant virus; and
  - (b) maintaining the plant under conditions and for a time sufficient to allow the carrier vector to complement the producer vector, so that the producer vector replicates in the plant; and
  - (c) maintaining the plant under conditions and for a time sufficient that the polynucleotide is expressed in at least some plant cells.
79. The method of claim 78, wherein the first and second plant viruses are the same virus.
80. The method of claim 78, wherein the first and second plant viruses are different viruses.
81. The method of claim 78, wherein the carrier vector comprises a wild type viral genome.